Precalc Warm Up # 4-2

A function is "Even" if it has Y-AXIS SYMMETRY.

A function is "Odd" if has ORIGIN SYMMETRY.

Tell if Even, Odd, or Neither.

1. $g(x) = x^3$ 2. $h(x) = x^2$ 3. $t(x) = x^3 + 5$

4. Which type of symmetry is described?

a. $f(-x) = -f(x)$ b. $f(-x) = f(x)$

HW Questions? p. 106

In Exercises 1–6, determine whether the indicated points lie on the graph of the given equation.

5. $x^2y - x^2 + 4y = 0$

(a) $(1, \frac{1}{5})$ (b) $(2, \frac{1}{2})$

In Exercises 7–10, find the constant C such that the given ordered pair is a solution point of the equation.

7. $y = x^2 + C, \quad (2, 6)$

In Exercises 11–18, find the x- and y-intercepts of the graph of the given equation.

13. $y = x^2 + x - 2$

In Exercises 19–26, check for symmetry with respect to both axes and the origin.

21. $x - y^2 = 0$

origin $(-x) \to -f(x)$ y-axis $(-x) \to f(x)$

$-x - y^2 = 0$

$0 = x + y^2$

x-axis $(-y) \to f(x)$

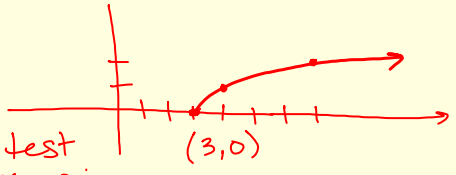
$x - (-y)^2 = 0$

$x - y^2 = 0$

In Exercises 33–52, sketch the graph of the given equation. Identify any intercepts and test for symmetry.

43. $y = \sqrt{x - 3}$

49. $x = y^2 - 1$



x-axis

$-y = \sqrt{x-3}$

$y = -\sqrt{x-3}$ ≠

y-axis

$y = \sqrt{-x-3}$ ≠

$y = \sqrt{-1(x+3)}$

origin

$-y = \sqrt{-x-3}$ ≠

$y = -\sqrt{-1(x+3)}$

In Exercises 61–68, write the given equation of the circle in standard form and sketch its graph.

61. $x^2 + y^2 - 2x + 6y + 6 = 0$

67. $16x^2 + 16y^2 + 16x + 40y - 7 = 0$

factor out 16 from 40:
start with $\frac{16}{16} \cdot 40$
$\frac{16 \cdot 40}{16}$ now factor out 16! & reduce
$16\left(\frac{40}{16}\right)$
$16\left(\frac{5}{2}\right)$

$16\left(x^2 + x + \frac{1}{4}\right) + 16\left(y^2 + \frac{5}{2}y + \frac{25}{16}\right) = 7 + 4 + 25$

$16\left(x + \frac{1}{2}\right)^2 + 16\left(y + \frac{5}{4}\right)^2 = 36$

$\frac{16}{16} \quad \frac{16}{16} \quad \frac{36}{16}$

$\left(x + \frac{1}{2}\right)^2 + \left(y + \frac{5}{4}\right)^2 = \frac{9}{4}$

center: $\left(-\frac{1}{2}, -\frac{5}{4}\right)$

$r = \frac{3}{2}$

HW Questions? p. 129

Evaluate:

5. $f(x) = 2x - 3$
(a) $f(1)$
(c) $f(x - 1)$

$f(x-1) = 2(x-1) - 3$
$f(x-1) = 2x - 5$

9. $f(y) = 3 - \sqrt{y}$
(a) $f(4)$
(c) $f(4x^2)$

13. $f(x) = \frac{|x|}{x}$
(a) $f(2)$
(c) $f(x^2)$

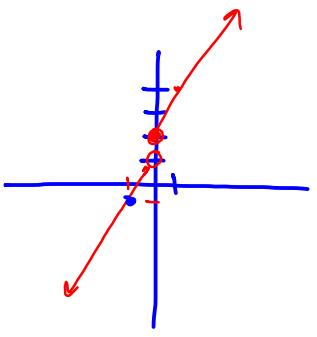
$f(x^2) = \frac{|x^2|}{x^2}$

$= 1$

17. $f(x) = x^2 - x + 1$

$\frac{f(2 + h) - f(2)}{h}$

15) $f(x) = \begin{cases} 2x+1, & x < 0 \\ 2x+2, & x \geq 0 \end{cases}$



$f(-1) = 2(-1) + 1$

$f(-1) = -1$

$f(2) = 2(2) + 2$

$x = 2$

In Exercises 23–28, find all real values of x such that $f(x) = 0$.

25. $f(x) = x^2 - 9$

27. $f(x) = \frac{3}{x-1} + \frac{4}{x-2}$ → $\frac{-3}{x-1} = \frac{4}{x-2}$

now cross multiply

In Exercises 29–38, find the domain of the function.

31. $h(t) = \frac{4}{t}$

35. $f(x) = \sqrt[4]{1 - x^2}$

can't $\sqrt[4]{-}$

$1 - x^2 \geq 0$

In Exercises 39–48, identify the equations that determine y as a function of x.

39. $x^2 + y^2 = 4$

$\sqrt{y^2} = \pm\sqrt{4 - x^2}$

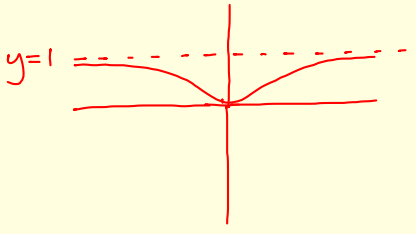
$y = \pm\sqrt{4 - x^2}$

43. $2x + 3y = 4$

47. $x^2y - x^2 + 4y = 0$

$y(x^2 + 4) = x^2$

$y = \frac{x^2}{x^2 + 4}$



Finding a difference quotient: $\frac{f(x+h) - f(x)}{h}$

input

f(x) = x² - 4x + 7

$\frac{(x+h)^2 - 4(x+h) + 7 - (x^2 - 4x + 7)}{h}$

$\frac{x^2 + 2xh + h^2 - 4x - 4h + 7 - x^2 + 4x - 7}{h}$

$\frac{h(2x + h - 4)}{h}$

$f(x) = \llbracket x \rrbracket$ is called the "Greatest Integer Function"

The outcome, f(x), is the greatest integer value without going over the input, x.

Graph:

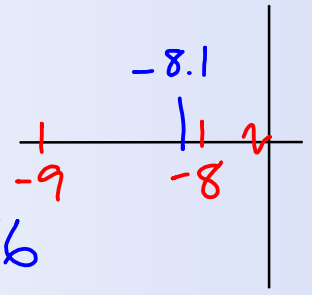
Find:

a. f(3) = 3

b. f(7.8) = 7

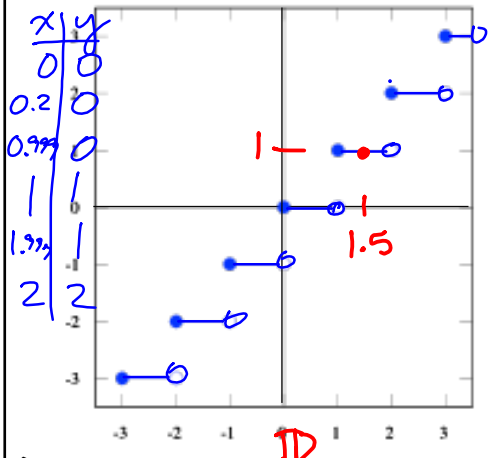
c. f(-8.1) = -9

d. f(-15.9) = -16



$f(x) = \llbracket x \rrbracket$

the greatest integer function, rounding down.

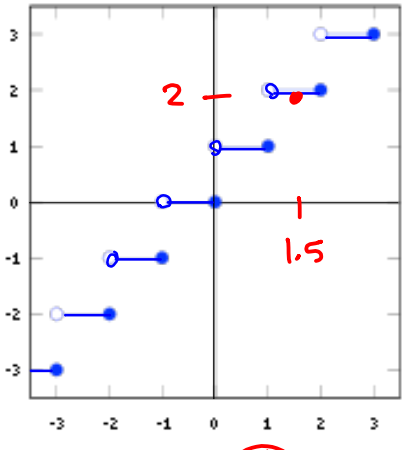


Dom: $x = \mathbb{R}$

Range: $y = \mathbb{Z}$ Integers

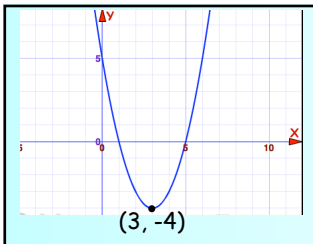
$f(x) = \lceil x \rceil$ Missing bottom

the ceiling function, rounding up.



Dom: $x = \mathbb{R}$

Range: $y = \mathbb{Z}$

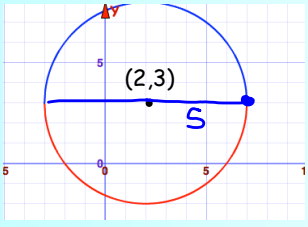


$f(x) = (x - 3)^2 - 4$

dom: $x = \mathbb{R}$

range: $y \geq -4$

function ? yes

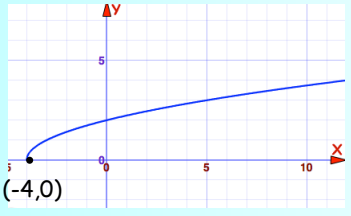


$(x-2)^2 - (y-3)^2 = 25$

dom: $-3 \leq x \leq 7$ $[3, 7]$

range: $[-2, 8]$

function ? No



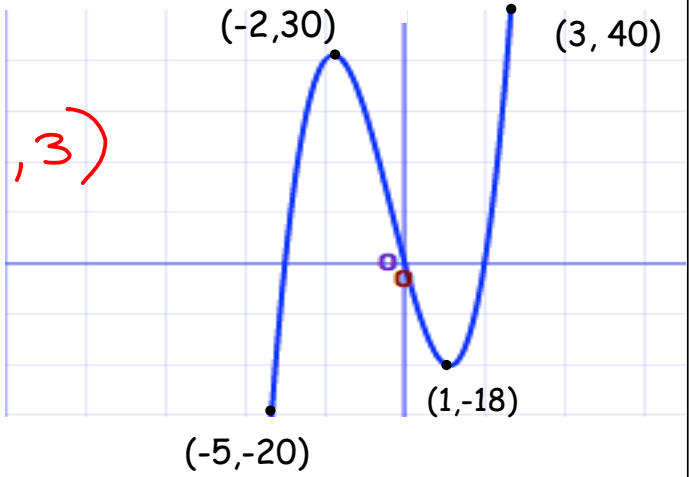
$f(x) = \sqrt{x+4}$

dom: $x \geq -4$ $[-4, \infty)$

range: $[0, \infty)$

function: yes

Determine the open intervals on which each function is increasing, decreasing, or constant. where? for what x?



Increasing:

$(-5,-2) \cup (1,3)$

decreasing:

$(-2,1)$

constant:

$\emptyset$

increasing:

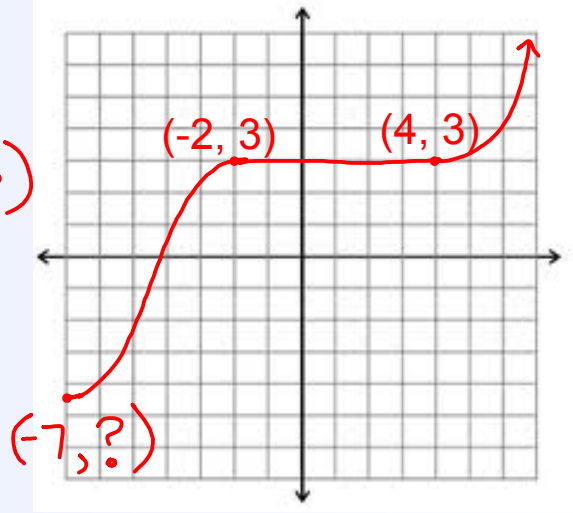
$(-7,-2) \cup (4,\infty)$

decreasing:

$\varnothing$

constant:

$(-2,4)$



HW: PC Book

p.129 # 16ac, 17, 61, 65, 69

p. 142 #3, 11 - 45 □

SL Book starting tomorrow.

Next Quiz: Mon. PC 2 / SL 5